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A Stakeholder Relations Strategy for Federal S&T

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A Stakeholder Relations Strategy for Federal S&T

May 2003

THE IMPACT GROUP

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1.0 INTRODUCTION

This report was commissioned in part to support the outcome of an ongoing discussion among science-based departments and agencies (SBDAs) on the future of horizontal S&T linkages within government. (Thus, we will use the term "horizontal communications", which is the communication counterpart of horizontal S&T linkages.) Having experimented over the past few years with a variety of mechanisms intended to foster closer interdepartmental S&T collaboration, SBDAs are now reviewing the lessons learned and developing principles and models for working together in the future.

Closer collaboration is being driven partly by the fact that the number of public policy issues that require an S&T input appear to be on the rise, while available resources have generally declined. This has created a need to do more with less. Moreover, the important S&T problems that the federal government is facing increasingly demand the involvement of more than one department (e.g. biotechnology stewardship, emerging diseases, climate change, northern S&T). Thus, collaboration also offers the prospect of more effective and efficient use of personnel, facilities and finances, which would go part way toward addressing the resource shortage.

Whatever form that future S&T collaboration eventually takes, one of its aims is to create a federal S&T system in which "the whole that is larger than the sum of its parts". The notion is that by combining S&T resources the federal S&T community will be stronger than if departments and agencies work on their own.

As SBDAs make progress in organizing their collaborate research activities[1], there will be an corresponding opportunity for horizontal (joint) communications around issues of mutual interest or concern. The same collaborative ideals that apply to S&T also apply to S&T communications; working together in a systematic way to communicate common messages can achieve more than working individually or on an ad hoc basis.

[1] R&D and RSA

2.0 BACKGROUND

"Horizontal communications" of federal S&T is by no means a new idea. For example, in 1998 the 5NR departments (Agriculture, Environment, Fisheries, Health, NRCan) commissioned a joint communication plan. This plan outlined mutual goals and objectives, messages, audiences, strategies and tactics for a collaborative natural resource-oriented communications program[2]. But there had been some earlier efforts at horizontal communications; the plan noted that prior to 1998 the original 4NR departments (5NR minus Health Canada) had undertaken a number of communication initiatives, under the auspices of a communications working group, including:

- Development of a speech to be delivered in the Fall, by the Clerk of the Privy Council. The speech is concerned with the role and importance of science and technology in the federal government;
- Ongoing work towards an ethics code of conduct for S&T;
- Expansion of the *Earth Tones* television series being produced in association with *Discovery Channel*;
- Development of a joint Web site; and,
- Creation of an inter-departmental communication committee/council (Working Group).

The most strategic of these activities was the speech that the Clerk delivered and which spoke of the importance of federal S&T. The other initiatives, though mostly tactical in nature, also spilled over to strategic communications. For obvious reasons, the 5NR initiative was limited to only 5 departments, and thus left other important S&T performers out of the equation.

The 5NR Communications Working Group was considered to be one of the most successful initiatives that was developed under the 5NR MOU. It produced the successful *Earth Tones* series of television vignettes. These were aimed largely at a "general public" audience, although there was spillover to other audiences as well. However, this working group had a limited mandate, which was to develop communication products on issues related to the 5NR departments and not to federal S&T more broadly. A recent assessment of 5NR communications concluded:

> *Every ADM interviewed felt they had not been briefed adequately or frequently on the activities, products and general accomplishments of the 5NR Working Group. Some were more aware than others about the details of the activities, but each made a special point*

[2]The Impact Group. "Your Resource for the Future". 4NR+H Communication Action Plan

of indicating they had not heard enough ... Directors General of Communications or their representatives had similar comments, though generally seemed more aware of activities, accomplishments and products.

Another common and important general impression was that horizontal communications efforts are essential, and that the Communications Working Group is to be commended for its efforts, though perhaps ***needs are now more on the strategic side rather than activities and products.*** (Emphasis added).[3]

The 5NR communications strategy that was developed in 1998 was intended to provide a focus to joint communications. It outlined 28 separate initiatives, some of which were strategic (e.g. Regional "Account Manager" Program) and some tactical (e.g. joint photo library). Due to circumstances that prevailed at the time, only a few of the recommended activities were implemented. Many of the original ideas are still relevant today.

With the apparent demise of the 5NR MOU, SBDAs are looking for a new model that will link their collaborative S&T activities, and joint communications could well be a component of any new horizontal S&T collaborative model that emerges.

A recent development on the communications front is that in Spring 2003 the Council of Science and Technology Advisors (CSTA) issued a report on S&T communications (SCOPE - Science Communications and Opportunities for Public Engagement). This report explores the challenges facing government with respect to its communication of federally performed S&T and proposes recommendations and mechanisms to improve the effectiveness of federal S&T communications. SCOPE has 4 major recommendations:

- Embrace concept of participatory S&T communications
- Adopt communications as an integral part of the management and conduct of S&T and S&T-informed policy
- Develop comprehensive S&T communications strategies
- Invest in S&T communications planning, training and delivery

However, SCOPE is largely a science communications guide, putting its emphasis on how SBDAs should communicate their science activities, rather than on how they should communicate their role and impact. As such, is has limited use for fashioning a stakeholder relations (SR) strategy.

[3] *5NR Communications Working Group. Next Steps Consultation Report.* January 2003.

3.0 PROBLEMATIQUE

For a number of years there has been concern among SBDA leaders that the federal S&T community has found it difficult to "tell its story" - to communicate a common message to stakeholders about the value of the S&T that is performed and funded by federal government departments and agencies. Individual departments and agencies work hard to tell their own stories to their own stakeholders, but it has been difficult to tell the story of federal S&T writ large. Some believe that the decline in federal spending on in-house S&T, which has now gone on for a decade, and the government's implicit decision to devote new resources largely to university S&T, are partial consequences of the difficulty in communicating the importance of federal S&T.

There have been two primary problems. The first is that until now there has been no SBDA-wide communication strategy or plan in place, and no motivation to develop one. The second is a consequence of the first; there is no one to carry out the work that would be identified in a plan.

Except on a problem-by-problem basis[4], it has been hard to tell the story of federal S&T, which is to say: build awareness of the importance of federal S&T; interest in its needs, activities and impacts; and, a willingness to invest additional resources in public good S&T. In the absence of a horizontal communication program that would provide information about the federal science enterprise, federal S&T collectively has been left without a common voice.

Although SBDAs have not pursued a formal joint communications program, there have been indirect attempts to communicate community needs. By default, these have centred on the Cabinet Memorandum process (e.g. science capacity, northern S&T, FINE). Although MCs were never intended to be communication vehicles, in a number of instances they have in fact served as the only vehicles which could be used to communicate joint needs, within departments and to other parts of government.

The SBDAs' situation stands in contrast to that of the university sector, which has been immensely successful in the past few years in attracting support to build its S&T capacity. The government has created new institutions and programs to address the universities' needs (e.g. CFI, Canada Research Chairs, NCEs) and the budgets of research funders has increased across the board (SSHRC, NSERC, MRC/CIHR). These gains are directly attributable to the successful efforts of the "G-10" university presidents[5] to directly lobby the finance and industry ministers. Such lobbying is, of course, off-limits to SBDAs.

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[4]That is, there is a tendency in government to spend money to solve near term problems on an ad hoc basis, rather than to build the capacity of the system.

[5]The presidents of the 10 largest universities.

What issues would a joint communication plan - a stakeholder relations (SR) strategy - address? The following set of issues concerning the perception of federal S&T is adapted from those presented in the 1998 SNR communication report. Five years later, most of the original issues are relevant to the current discussion.

3.1 Awareness and Perception of Federal S&T

This set of communication issues related to the awareness and perception of federal science and technology activities.

3.1.1 Visibility

Few people inside or outside government have a "top-down" appreciation of the scale, scope or impact of the federal government's science activities. At best, awareness of federal science and technology tends to be partial. People concerned with health science may know about the activities of Health Canada's S&T activities. Those in the mining and metal processing business will be aware of CANMET, and so forth. But few people inside or outside of government have a wide understanding of who the federal S&T community is, what it does, why it does it, or what it achieves. Except in times of crisis - for instance, when a lab is threatened with closure, or there is a national emergency (SARS, BSE, West Nile Virus, etc.) - the federal government's science and technology establishment is largely invisible.

3.1.2 Legislative/Regulatory Role

A large part of what the federal government does in different fields of science and technology is directly mandated by legislation or regulation. However, the legislative basis of federal S&T is little-understood. The Government of Canada is constitutionally responsible for many aspects of public policy that have a science and technology underpinning, such as; importation of crops and livestock, food safety, drug testing, mine safety, allocation of fishing quotas, international trade in natural resources, or setting of environmental standards, to name a few.

By the same token, much of the S&T in government does not have a firm legislative base, and is the product of permissive legislation ("the Minister may ..."). It is harder to explain the rationale behind permissive S&T activities than mandated activities. Whether S&T is mandated or permissive, increasingly, every government needs a strong science and technology capacity to establish and apply public policy in relevant areas. But the link between science and policy is not well known.

3.1.3 Credibility of Federal S&T

Regrettably, the visibility of the federal government's S&T activities is often highest at times of crisis. There are recent examples in health, agriculture, security, fisheries, and environment, but over time, the spotlight of public awareness falls on all departments. Government S&T is inevitably linked with political decision-making. When the public perceives that decision-making has failed, there is often a perception that the underlying S&T advice has also failed. The cumulative effect can be a perception of "bad science" in government labs, and as a result, a diminished credibility of federal S&T.

In past there have been a small number of public accusations that independent science advice in government has been manipulated to political ends. Regardless of their merits, accusations such as this inevitably undermine the credibility of federal S&T generally, both outside and inside government.

3.1.4 Quality of Federal S&T

There is a perception among certain groups that because it is not peer-reviewed in the same way as university science, that federal S&T is somehow of lower quality. Critics turn this into a blanket condemnation of the quality of science in government, not acknowledging the many additional factors that help to ensure the quality of science in government - everything from oversight by departmental science advisory boards, to the requirement to produce research strategies and plans, and thereby, to annual justify expenditures.

3.1.5 "Old-technology" Image of Federal S&T

Though most often directed at the natural resource-oriented SBDAs, some individuals associate government S&T with "old technology" and "old economy". There is a feeling that natural resources in particular are perceived as low-technology sectors of the economy, compared with such high-technology sectors as information technology or new materials (e.g. nanotechnology). Many people do not appreciate that all parts of the economy are already high-tech. Agriculture and forestry are heavily reliant on genomics. Mining is quickly adopting robotic technology. Fishery research depends on sophisticated climate and habitat modeling. Other natural resource activities have a similar high technology aspect, but this is not well understood.

3.1.6 Media Coverage of Hot Issues

A number of departments believe they have been the subject of poor media coverage on controversial topics. Coverage by professional science reporters is by and large good, but reporting by generalists can be problematical. At the best of times media coverage of public

policy issues can be uneven, but there is nonetheless a feeling that more can be done to improve the coverage of S&T.

3.2 Role of Federal S&T

The following issues are concerned with the understanding of the role of federal S&T - that is, the unique place that it has in the national system of innovation.

3.2.1 Unique Federal S&T Role

S&T conducted in or paid for by national laboratories plays a unique role in that it is directly linked to public policy (unlike university or industry S&T). All governments need an in-house S&T capacity to support decision-making; both to assess external S&T information and to develop timely solutions to national requirements. Yet most people's understanding of the unique role of federal S&T is at a low level. Moreover, the role of federal S&T does evolve along with the needs of the government, the economy and society. The unique role that federal S&T plays, and how it is distinct from other forms of S&T is not well appreciated.

The 2002 Federal S&T Forum helped to address many of the common concerns of SBDAs and their employees. Although it was organized primarily as an internal-to-government event, the forum did have some spill-over benefits in that the audience included people from central agencies. With hindsight, more could have been done to give the S&T forum an external focus as well as an internal one, in which case it could have done more to emphasize the unique role of federal S&T.

3.2.2 Research-Assessment-Policy Process

Science-based public policy is created in a generic 3-stage process. The first stage involves original research, which may be conducted in-house or contracted out. In the second stage a government department utilizes an assessment process that takes the result of in-house and commissioned research, together with information from the published literature, and formulates

policy recommendations (e.g. acceptable environmental toxicology levels, fishing quotas, etc.).

In the third stage, elected officials consider the scientific advice in the context of other social and political considerations, and formulate policy. This process - and especially the role of research and assessment - is not well understood.

3.2.3 Crown Liability/Contingent Liability

Directly and indirectly, the Crown is exposed to potential financial liability in connection with its governance decisions. Blood supply, SARS, Atlantic cod, stock, and building standards are recent examples where science policy decisions had or are likely to have substantial fiscal repercussions - they cost the government and taxpayers a great deal of money to settle. There is little awareness of role of the federal science establishment in guarding the crown against liability. To a certain degree federal S&T represents an "insurance policy" against crown liability.

3.2.4 Stewardship of Common Resources

In many situations the federal government is the steward of our air, land, water and human resources (though this is a responsibility that it often shares with the provinces and territories.) Increasingly, stewardship decisions have a scientific or technological underpinning. Government's stewardship function demands that it have access to the best available scientific advice, and a capacity to assess that advice. Federal SBDAs play a vital role in both research and assessment in support of stewardship. Again, this role is not widely appreciated.

3.3 Achievements and Resource Allocations

Departments believe they face mutual issues with respect to communicating the outcomes of their work and the allocation of public resources. Here are some of the underlying issues.

3.3.1 Impacts and Benefits of Federal S&T

Awareness tends to be low of the impacts and benefits of federal S&T. Individual departments produce worthwhile impact and benefit studies, but little has been done to demonstrate the wider, cross-departmental value of federal S&T. Laudable efforts such as the FPTT awards tend to have an internal focus, rather than promote achievements to an external audience. While every department makes considerable effort to promote its own achievements, little is done to

promote overall accomplishments[6]. Except for information compiled for joint MCs (e.g. science capacity, northern S&T) there has been no sustained effort to put undertake and present original research and analysis of the overall science capacity situation that SBDAs find themselves in.

3.3.2 Support for Federal S&T in the University Community

A number of departments believe that relations with the university community have been strained in recent years, as federal support for in-house R&D has declined and university research support has significantly advanced. Even though SBDAs have extensive relations with the university sector, little has been done to catalog and promote past interactions and future opportunities. As a result, there is a feeling - often true - that the university research community does not support the federal S&T sector. More troublesome is that there is no formal mechanism for dialogue with the higher education sector on matters of S&T.

3.3.3 Perceived Government Investment Bias Towards Universities

Recent budgetary decisions have increased research funding to the university sector, while in-house S&T spending has been largely stagnant. Many departments feel they have not adequately made their case to the government for the need for a renewed investment in federal S&T. The point is that government science and university science are both important and that society needs to strengthen each.

3.4 Human Resources

A fourth set of communication issues concerns human resources.

3.4.1 Morale in SBDAs

The cumulative effect of fiscal restraint, changing business practices[7], and public scrutiny have led to low morale in many federal laboratories. This is affecting productivity, risk-taking and innovation, and could have negative implications for the future.

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[6]One example is the annual report on the implementation of the 1996 strategy (Science and Technology for the New Century) that Industry Canada compiles. However, this tends to be a "shopping list" of activities, rather than of outputs and impacts.

[7]For example, cost recovery operations.

3.4.2 Confusion Over Roles

Several departments report there is a certain degree of confusion among staff over the evolving role of the federal scientist, arising from unprecedented scrutiny of science-based policy decisions. The confusion concerns such matters as publication of scientific research, communication with the public, and the role of research in policymaking.

3.4.3 Short- and Medium-Term Recruitment Challenges

Low morale and uncertainty have created short- and medium-term recruitment challenges for many federal SBDAs. Public service research careers are not so appealing to young scientists and engineers as they once were. If young people perceive that federal S&T is in decline, they will be reluctant to invest their careers in the public sector. Together with the impending retirement bulge in the federal S&T establishment, this does not bode well for future recruitment.

4.0 AN AWARENESS-BUILDING MODEL

Awareness-building - whether for consumer products or federal S&T - follows a logical sequence. The first phase is simply building awareness of a product (e.g. new brand of beer), service (e.g. carpet cleaning), or entity (e.g. federal S&T). Brewers, for example, will spend millions to launch a new brand of beer, and the first step is to build awareness of the brand in the mind of the consumer.

But building awareness is only the first step. Once there is awareness, the next step is developing an **interest** on the part of the audience (consumer) in the product or issue. It's no good simply to build awareness of a new brand of beer ... the brewer needs to develop an interest on the part of the consumer in sampling it.

Interest in the new brand next has to be converted to a positive **desire** to act on the new-found interest - to actually sample the new offering, given a chance. And finally, consumers need to take **action** on their desire to change (by actually purchasing the new beer for the first time).

In many respects it is easier to sell products than ideas, because consumers can take direct action to reinforce their decision - they can purchase the product and in the process of consuming it, can obtain reinforcement for their decision to act (cf. "This tastes good ... I'll have another".) Ideas are harder to sell because it's often more difficult for people to act on their

nascent desires, because it can take a long time to gain reinforcement for their decision, and because the reinforcement can be indirect.

People in the business of selling ideas often make the mistake of believing they have succeeded simply by building awareness. The real challenge, though, is to turn awareness into action. So, while it's helpful that people are aware of, for example, third world poverty, their heightened awareness isn't much help unless they actually make a contribution to (say) an international development charity.

Much the same applies to promoting federal S&T. Awareness is the first step, but action is the desired outcome.

5.0 THE STAKEHOLDER RELATIONS (SR) APPROACH

This chapter discusses the "stakeholder relations" (SR) model for horizontal communications of federal S&T activities. It includes a discussion of federal S&T stakeholder relations activities in the US and UK. In addition, it includes a discussion of stakeholder relations in the university sector in Canada.

> **Stakeholder relations consists of providing an organization's stakeholders with timely and relevant information about its goals, objectives, activities, outputs, impacts and benefits. It also includes listening to and addressing stakeholder's interests and concerns.**

The goal of stakeholder relations is to increase stakeholders' confidence in an organization (or group of organizations).

5.1 Stakeholder Relations in the Private Sector

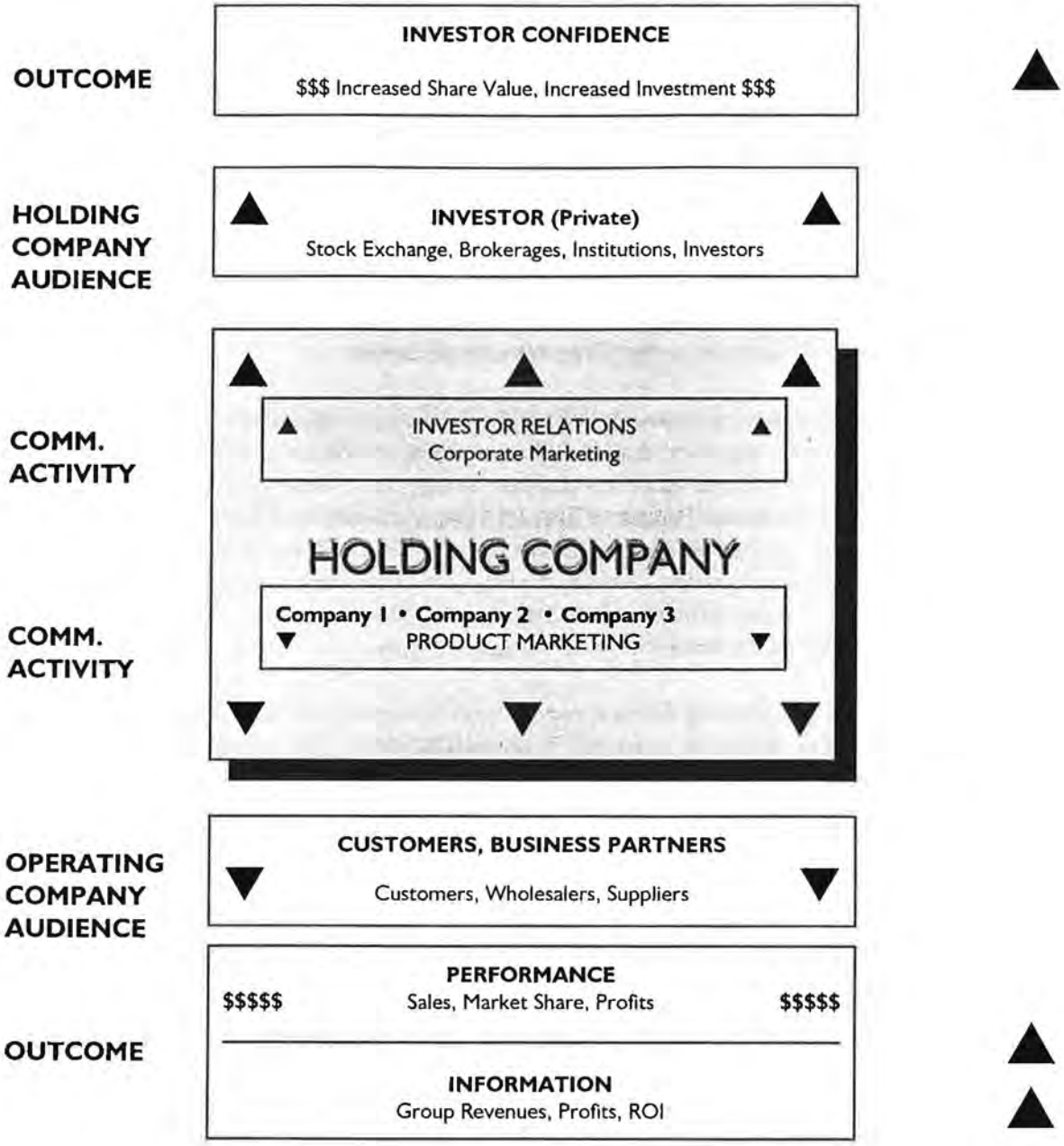
The federal S&T community's challenge is to increase awareness and interest in its activities (and eventually promote action to address shared needs). In this, its needs are not dissimilar to the awareness needs of a private corporation (Figure 3). A typical large private corporation operates as a Holding Company that in turn owns a number of Operating Companies[8]. This is analogous to a large government department that "owns" a variety of specialized laboratories, or to the federal government which "owns" all the departmental labs.

In the corporate world, the Holding Company and the Operating Companies have different audiences for their communication and marketing activities. The Operating Companies' audience is their customers and business partners, such as wholesalers or suppliers - people with whom they have financial and other business dealings. Operating Companies sell products or services to their customers and purchase materials from their suppliers. They provide information on their performance or impact to their owner, the Holding Company. As such, they report on such matters as sales, profits, return-on-investment and so forth.

[8]For example, Noranda Inc. owns different businesses in the copper, aluminium, zinc, recycling industries. Noranda Inc. is comparable to a large SBDA. Each of its businesses is comparable to the sectors/branches/divisions of an SBDA.

Figure 3

CORPORATE RELATIONS MODEL



The Holding Company aggregates the Operating Companies' performance information and presents the group performance information to its key audience, the Investment Community. This includes the Stock Market, Institutional Investors, Pension Funds, and so forth. Positive group performance - profits - in turn boost the value of the Holding Company's shares and increase stakeholders' confidence in the firm. This in turn allows the company to sell more shares (equity) or to borrow money (debt) to invest in operations.

Whereas the principal aim of the Operating Companies is to earn profit, the principal aim of the Holding Company is to increase stakeholder confidence. Each Operating Company has its own **Communications and Marketing Department**, which supports the sales effort. But the Holding Company has a separate **Investor Relations Department** that deals with the Investment Community. Its objective is to increase the value of the stock.

5.2 Stakeholder Relations in the Public Sector

5.2.1 Stakeholder Relations at the Departmental Level

Like an Operating Company, an individual federal department or laboratory is concerned with communication and marketing to its stakeholders - primarily its Clients and Business Partners (Figure 4). A lab's stakeholders include companies the laboratory is working with, research partners such as universities and Provincial Research Organizations, and other stakeholders such as industry associations or international standards organizations. While Federal Laboratories do not "sell" their facilities and expertise in the same way or for the same reason as Operating Companies, they do have performance objectives, such as developing new technology, producing public goods or increasing national competitiveness.

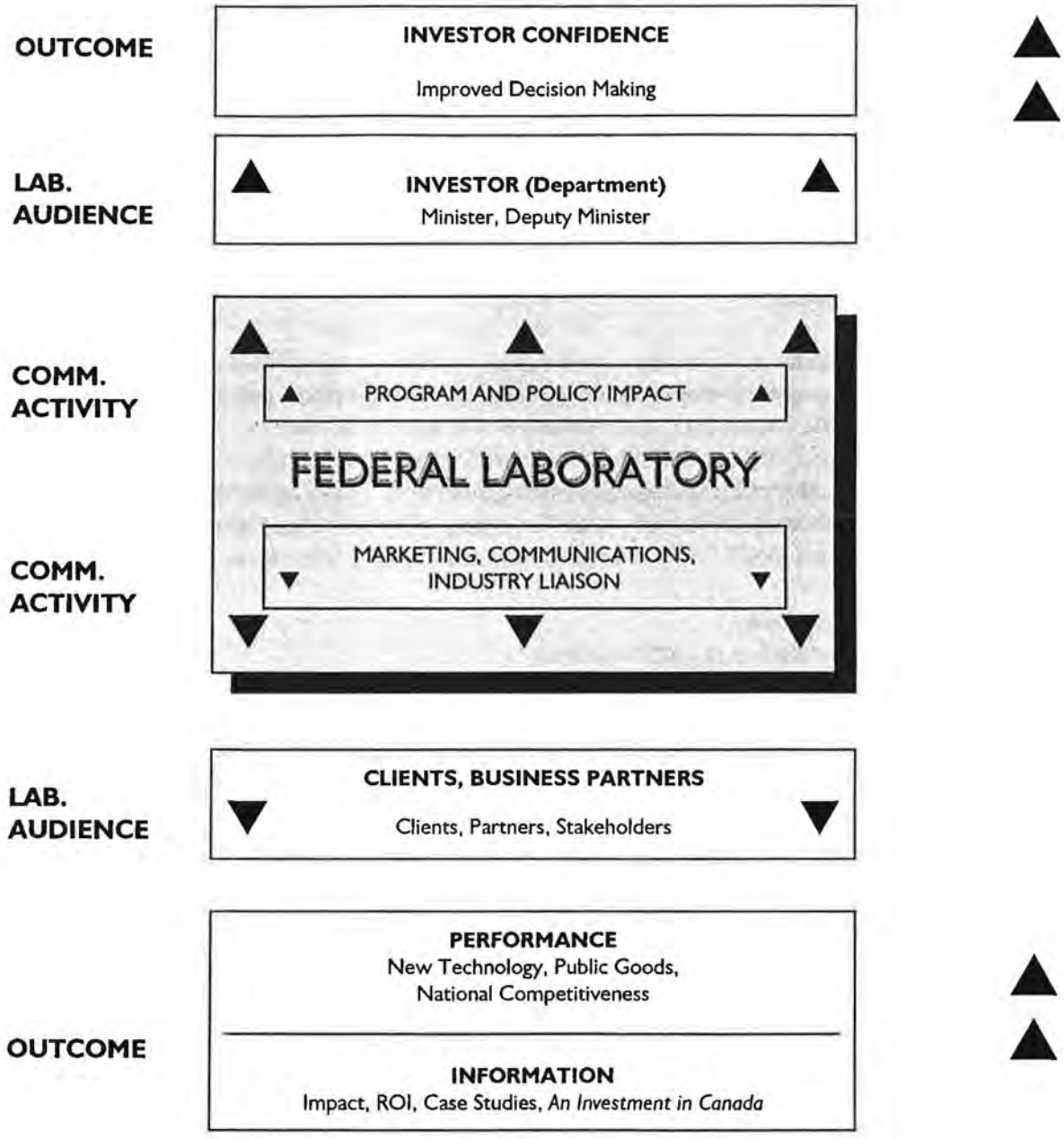
And, like private sector Operating Companies, Federal Laboratories produce information on their performance. But instead of producing financial statements, they provide impact studies, evaluations, case studies, return-on-investment analyses, and so forth.

Individual federal Laboratories normally think of their primary "Investor" as their Minister or Deputy Minister. For a variety of reasons - including custom, protocol, and limited resources - laboratories tend not to interact directly with their wider "Investment Community", that includes Central Agencies and Elected Officials. And, unlike Holding Companies, they do not have a dedicated Investor Relations group whose job it is to increase stakeholder confidence in their activities. In any event it would probably not be appropriate or practical for an individual government department to have such a group.

Thus, comparing the corporate and government models, what's missing from the government model is what the corporate world would term an invesoor relations function - an ability to communicate with the government's stakeholder community.

Figure 4

FEDERAL LABORATORY RELATIONS MODEL



6.0 OTHER MODELS OF S&T STAKEHOLDER RELATIONS

Meetings with officials of 4 US government and non-profit agencies[9], the Association of Universities and Colleges of Canada (AUCC), together with a review of literature on the UK parliamentary science situation, provided background information for this discussion.

6.1 The NRC Experience

The National Research Council of Canada has had what is arguably the most effective S&T stakeholder relations program of any SBDA. NRC has hired a succession of people "who know the government system" in its Corporate Communications branch. Often, these people have previously worked in ministers' offices. Unlike in most departments, at NRC S&T communications is a high priority for its corporate communications group[10]. S&T communications also enjoys high-level support from the President and Vice Presidents. And, NRC makes a long-term commitment to stakeholder relations for S&T. NRC's strategy is to "focus on the gatekeepers".

NRC "doesn't hide from parliamentary committees". Unlike in most SBDAs, which tend to appear before parliamentary committees only when summoned (and usually in the expectation of a rough ride). NRC proactively seeks out opportunities to contribute to parliamentary committee discussions. This provides it with a non-confrontational opportunity to promote its S&T cause. This it does, not by talking about how good NRC is, but rather by talking about the benefits of S&T. It de-emphasizes money and budgets, and talks instead about the value-added that NRC brings to the table[11]: "NRC brings more than money", is its theme. NRC also:

- Briefs party caucuses
- Offers information to opposition parties;
- Involves politicians in its announcements;
- Gives credit to partners (such as ACOA, for example);
- Invites politicians (e.g. the Chair of the Atlantic caucus) to participate in its roundtable discussions; and,
- Relies on third-party "testimonials" to highlight NRC's impact.

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[9]National Institutes of Health, The National Academies, Federal Laboratory Consortium, AAAS

[10]In most SBDAs, corporate communication departments attend primarily to the minister's and deputy minister's agenda. S&T communications is a minor facet of the work of most departments' corporate communications offices. In most departments, S&T communications tends to rest in various branches, services or sectors, and is seen as a secondary priority.

[11]For example, NRC's role in regional economic development.

NRC officials point out that there is no focal point for federal S&T: no spokesperson, and no organization that is the identifiable point of contact. In this circumstance it is difficult to engage in corporate communication.

6.2 Stakeholder Relations at AUCC

AUCC (Association of Universities and Colleges of Canada) is the voice of Canada's universities. It represent 93 Canadian public and private not-for-profit universities and university-degree level colleges. Since 1911, it has represented its members in Canada and abroad. AUCC's mandate is to facilitate the development of public policy on higher education and to encourage cooperation among universities and governments, industry, communities, and institutions in other countries. It provides services to member universities in three main areas:

- public policy and advocacy
- communications, research and information-sharing
- scholarships and international programs

The enormous success that the university research community has had in attracting support from the federal government is largely attributable to AUCC's lobbying efforts. Beginning around 1995, AUCC began to organize a lobbying campaign with the minister of finance. The presidents of the G-10 universities (the 10 largest universities) met with Mr. Martin at his farm and explained they were losing groung to their counterparts in the US. Mr. Martin invited them to propose some remedial measures, and within a few short years the government had created CFI, CIHR and the Canada Research Chairs program. It also increased the budgets of the Granting Councils and expanded the NCE program and put it on a permanent footing.

As private institutions, universities enjoy a high degree of independence when it comes to lobbying government. There are many of them, they are located in every region, and they have a direct link to the lives of most politicians (they or their children have, are, or will attend university). AUCC has a small (3 staff) full-time office dedicated to government relations.

AUCC has a high-profile President who formerly worked as a senior federal official. It can call on university presidents for specific lobbying activities. It produces studies and reports that highlight its case. It engages the media when necessary. It promotes the university cause on an ongoing basis. It's views are sought by government departments developing funding strategies. It has allies in the granting councils and other funding organizations. In short, AUCC has a full arsenal of lobbying and communication tools at its disposal.

While AUCC's relations with central agencies and politicians are deep and wide, its relationships with federal SBDAs are virtually non-existent. There is at best a benign atmosphere of cooperation between SBDAs and the university community, and at worst, an outright hostility. For example, many in the university community are convinced that government science is

second-rate, because it is not peer reviewed. There is little understanding of the unique role of federal in-house S&T, among many academics.

AUCC could act as the facilitator of high-level discussions between SBDAs (S&T ADMs) and their university counterparts (VPs Research). These discussions could pave the way for improved relations among the two communities. There is a need for each to recognize the other's unique role and ways of collaboration that could lead to mutual benefits. AUCC staff would be willing, if asked, to initiate such a dialogue.

6.3 The US Situation

Unlike in Canada, the US budgeting system is largely controlled by the legislative branch (Senate, House of Representatives)[12]. The executive branch (President) proposes a pro forma budget, but the real work of allocating funds falls to a myriad of congressional committees. The executive branch can veto congressional appropriations, but de facto, congress sets the budget. Congress - individual senators and congressmen - also originates legislation in the US system. Thus government departments and agencies routinely interact with congress when legislation is being formulated or amended.

Government departments and agencies routinely appear before congressional committees to explain their budget requests, and each department has a permanent office for congressional liaison. However government departments and agencies do not lobby congress as such. These offices do provide extensive information to congress as part of the budgeting and legislative processes.

A huge lobbying industry has sprung up around the budgeting and legislative processes, with each interest trying to influence congressional funding for its constituency. Companies, industry associations, professional associations, and the non-profit sector maintain offices in Washington to keep a pulse on budgetary and legislative developments, and to influence them.
The pivotal role that congress plays in budgeting and lawmaking in the US system ensures that government departments and agencies interact on an ongoing basis with the legislative branch. Unlike in Canada, their interactions are not shielded by (or filtered through) the executive branch. That means that individual congressmen are familiar in detail with the operations of government departments and agencies.

[12] In parliamentary systems budgeting is under the de facto control of the executive branch (Cabinet), although approval of the legislative branch (House of Commons) must be sought.

6.3.1 National Institutes of Health (NIH)

NIH, an agency of the Department of Health and Human Services, is the world's largest research institution. It supports more than 50,000 scientists at over 2,000 universities, medical schools, teaching hospitals, independent research institutions and industrial organizations[13]. Grants are awarded through peer review. Around 43,000 research and training applications are reviewed annually.

NIH devotes 80% of its budget to external research, and around 9.5% to intramural research at its 27 institutes and centres. (The balance of funds are for administration). It has around 18,000 employees of which over 4,000 hold professional or research doctorate degrees. Five Nobel prize winners made their award-winning discoveries in NIH laboratories. Congress has nearly doubled NIH's budget in the past 5 years, from $15.6 billion in 1999 to $27.2 billion in 2003. (This compares with around $5 billion for NSF.) How has NIH been so successful in attracting support?

A large part of NIH's success is due to the efforts of the Ad Hoc Group for Medical Research Funding, which was established in 1982. The Ad Hoc Group is a consortium of over 300 biomedical and behavioural research organizations (e.g. American Heart Association, Biotechnology Industry Organization, NYU School of Medicine, etc.). Year-round, the Ad Hoc Group for Medical Research Funding brings together organizations concerned with medical research and NIH funding. It holds Policy Breakfasts on Capitol Hill that provide an opportunity to discuss medical research and legislative proposals with policy makers and opinion leaders. It also provides a forum for NIH Institute and Centre Directors to address NIH advocates.

The Ad Hoc Group includes direct beneficiaries of NIH funding (e.g. medical schools) and indirect beneficiaries (e.g. companies, disease organizations). It has clearly had a major influence on NIH funding, although other factors are at work. Not least of these is that health research touches individuals - everyone has a chance of directly benefiting from medical research.

The Government Performance and Results Act (GPRA) is driving NIH and other government departments and agencies to become much more outcome-oriented in their programming and reporting. As a result, NIH has begun to establish concrete research outcome goals (as opposed to research funding input goals) for its grants programs. Goals are expressed in a matrix of time (1-3 years, 4-6 years, 7-10 years) against risk (high, medium, low). So, for example in 1-3 years NIH promised its research will "develop one or more prototypes for a low-power, highly directional hearing aid microphone to help hearing-impaired persons better understand speech in a noisy background" (low risk). In 7-10 years it hopes to "reduce the total years lost to disability by 10%" (high risk).

[13]Many Canadian researchers receive funding from NIH.

Laying out ambitious outcome goals such as these makes it easier for congress to understand "what their money is buying", and for NIH to attract financial support.

Incidentally, one of the arguments that NIH uses to differentiate its in-house research from university research, is that "government research can 'turn on a dime'" in times of national need (e.g. West Nile Virus) - it doesn't need to apply for a grant ! (In fact, NIH researchers are close to a vaccine for West Nile Virus). Another argument is the "Manhattan project" argument - that large scale scientific ventures of national importance are best done in-house.

Thus, several lessons can be drawn from NIH's successful experience in attracting support:

1. Third parties can promote an organization's interests more effectively than the organization can itself.

2. Research outputs and outcomes attract more support than inputs.

3. Ongoing dialogue with decision makers, around day-to-day business issues, is more effective than sporadic communications around contentious issues.

4. Issues that people relate to directly (e.g. my health, my family's health) are more persuasive that those that relate to people indirectly (e.g. climate change). It helps to personalize issues (e.g. "The spread of West Nile Virus is directly associated with climate change, and you and your family may be at risk from the virus if we don't ... ".)

5. A clear presentation of the unique role of government science is important (e.g. fast response, Manhattan project).

6.3.2 The National Academies (NAS, NAE, NRC, IOM)

The US National Academy of Sciences (NAS) was chartered by President Lincoln in 1863, originally to advise on S&T issues arising during the waging of the Civil War. The NAS is a society of distinguished scholars and is dedicated to the use of science and technology for the public welfare. It acts as an advisor to the federal government, sponsors symposia, monitors human rights abuses against scientists worldwide, promotes the public understanding of science, and publishes a research journal, *Proceedings of the National Academy of Sciences*.

The National Research Council was founded in 1916 as the principal administrative arm of NAS, (and later NAE and IOM-Institute of Medicine). Council staff convene study committees for NAS and NAE, and most of the studies appear under the Council's name. (The IOM convenes its own committees). NRC also brings together scientists, engineers, and educators to set priorities and encourage self-examination and improvement within their professions. NRC also works to improve science and math education at all levels, from kindergarten to doctoral

research. Although it does not conduct primary research NRC has a research staff of more than 1,000.

The National Academy of Engineering (NAE) was established in 1964 under the NAS' charter. It is an autonomous body that shares responsibility for advising the federal government. It conducts studies of policy issues in engineering and technology, encourages education and research, and grants awards to distinguished engineers.

The Institute of Medicine (IOM) was established by NAS in 1970. It examines policy matters pertaining to the health of the public, and shares responsibility with NAS and NAE for advising the federal government.

Membership of the academies totals more than 4,800 of the country's leaders in science, engineering, medicine and related fields. More than 500 committees involving around 5,700 individuals work on specific issues each year. About 55% are from academe, 24% from industry, 9% from nonprofit institutions, and 12% from all levels of government. NAS advises the government without compensation (expenses, but no fees). Government departments can sole-source projects to the academies.

The academies produce Consensus Reports, Surveys of the Disciplines, Oversight reports, Meetings, Roundtables and forums, and manage specific programs for sponsoring agencies (e.g. fellowship programs). Each year the academies complete hundreds of studies. US government agencies contributed nearly $181 million to academy studies, and the private and nonprofit sectors commissioned another $52 million of work. The academies are viewed as independent, impartial research groups.

Many of the academies' studies are directly concerned with federal S&T. A few of many examples include:

- *Communicating Uncertainties in Weather and Climate and Climate Information*
- *A Century of Ecosystem Science: Planning Long-term Research in the Gulf of Alaska*
- *Knowledge and Diplomacy: Science Advice in the United Nations System*
- *Animal Biotechnology: Science-Based Concerns*
- *Measuring Problems in Criminal Justice Research*

It is notable that academy studies cover the scientific aspects of all government functions, from defence to social services - not only hard science issues per se.

According to a senior NAS official, "Congress now understands innovation". The innovation message was strongly conveyed by Federal Reserve Chairman Greenspan in the late 1990s. And, everyone in congress is familiar with the role that DARPA played in creating the Internet. Congress is now looking for the "next big thing" in science - a platform science that will drive

major economic activity. Clearly, life science is attracting major attention (see the previous discussion on NIH), and nanotechnology is emerging as a hot topic.

The academy system provides a powerful independent voice for science that originates outside of government, but is largely targeted to government[14]. Many of its studies and reports are commissioned by government departments and agencies, or by congress, and focus directly or indirectly on federal S&T. For example, a 12 May 2003 report[15] concluded that:

> *"The U.S. Environmental Protection Agency's competitive research grants program has yielded significant new findings and knowledge critical for EPA's decision-making process ... Established in 1995, the grants program was designed to enable the nation's best scientists and engineers to explore new ways to safeguard the environment and protect public health".*

Reports such as these feed back independent information to decision makers about - in this case - the quality of federally-funded R&D. When requested, the National Academies provide government departments with neutral advice on their activities and their performance. Because they are viewed as independent and neutral their advice is highly sought. When an academies report gives good marks to a government department or agency, that acts as confirmation that those organizations are doing a good job.

6.4 The UK Situation

As in the US (cf. National Academy of Science), science and government have been much more closely linked in the UK than in Canada. Science has always had a high standing in the salons of power in Great Britain[16]. The Royal Society included among its members many "gentlemen scientists" from the upper classes. Scientists and parliamentarians rubbed shoulders at the Athenium - a gentlemen's club which is described in one guidebook as *"This is the Gentlemen's Club for the "intellectually elite" and so it is named after the ancient Roman Athenaeum, which was the Roman centre for the study of literature and science. Over the years numerous Prime Ministers, Cabinet Ministers, literary figures and church leaders have been members of the Athenaeum".* Following is a discussion of the main linkages between science and government in the UK.

6.4.1 The Parliamentary and Scientific Committee (PSC)

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[14]Although many expected that the last Canadian budget would establish a corresponding academies system in Canada, the initiative was not funded.

[15]The Measure of STAR: Review of the U.S. Environmental Protection Agency's Science To Achieve Results (STAR) Research Grants Program.

[16]Though interestingly, not engineering.

PSC was established in 1939 as a body associated with but not part of Parliament. It is a forum for the exchange of information and ideas between the worlds of politics and science, technology and engineering. PSC also produces a journal *Science in Parliament*. The journal, published four times a year, includes:

- Authoritative addresses to the Parliamentary and Scientific Committee: recent addresses have included those on MMR and Autism, Science for Agriculture and Sustainable Development.

- Reports on the activities of the Science and Technology Select Committees in both Houses of Parliament and a summary of the briefings received by MPs from the Parliamentary Office of Science and Technology and the Science and Environment Section of the House of Commons Library.

- The UK Parliamentary section reports on policy issues and activities relating to science and technology: progress of legislation, selected debates and reports, detailed digests of Questions and Answers and Debates related to science and technology.

- The Euro-News section gives concise information on scientific news and events within the European Union, reports on progress of legislation and provides a digest of European Parliamentary Questions related to science and technology.

- The Science Directory: a source of expert advice or impartial opinion on scientific and technological subjects.

The circulation of Science in Parliament includes all Members of Parliament, Members of the House of Lords and UK Members of the European Parliament who are members of the Committee, the scientific and industrial membership of the Committee and science attachés in UK embassies abroad and in foreign embassies in London.

The Parliamentary and Scientific Committee is a primary focus for scientific and technological issues providing a long-term liaison between Parliamentarians and scientific bodies, science-based industry and the academic world. The main aim is to focus on those issues where science and politics meet, informing Members of both Houses of Parliament by indicating the relevance of scientific and technological developments to matters of public interest and to the development of policy.

The Committee meets once a month when Parliament is sitting to debate a scientific or technological topic and its relationship with political issues. These debates take place in the Palace of Westminster, starting at 5.30 pm and are usually followed by informal receptions. Attendance is typically 80-100 with about one quarter being Parliamentarians. Most debates are followed by a working dinner where the informal atmosphere facilitates open and wide-ranging

discussion between interested Parliamentarians and those most closely concerned with the evening's topic.

The Committee arranges visits to industrial and scientific establishments. Typically a party of a dozen or so will include two or three Parliamentarians who will thereby have an in-depth introduction to some aspect of the real world of science and technology.

6.4.2 Office of the Chief Scientist

The Secretary of State (SoS) for Trade and Industry has overall responsibility for the Government's science policy and support for Science and Technology (S&T) in her cross-Departmental role as the Cabinet Minister for Science and Technology. SoS aims to strengthen the UK's S&T capabilities and to maximise the contribution to sustainable growth and quality of life in the UK. The SoS is supported in this role by the Department of Trade and Industry's Minister for Science, and the Office of Science and Technology.

The Office of Science and Technology (OST) leads for Government in supporting excellent science, engineering and technology and their uses to benefit society and the economy. Its objectives are:

- To sustain and improve the science and engineering base;
- To improve the performance of Government departments using science and technology;
- To optimise the benefits to UK science from EU and international activities;
- To improve the flow of people and ideas between the science and engineering base and users;
- To improve engagement between science and the rest of society;
- To ensure sound advice is given to Ministers across Government on science issues;

OST is headed by the Chief Scientific Adviser (CSA) to H.M Government, Professor Sir David King, and is responsible for developing and coordinating Government policy on science and technology both Nationally and Internationally. OST is also responsible for the allocation of the Science Budget (currently just under £2.4 billion per annum) into research via the Research Councils for which the Director General of the Research Councils (DGRC), Dr John Taylor, is responsible. The Office of Science and Technology is split into two groups; the Science and Engineering Base Group (SEBG) and the Transdepartmental Science and Technology Group (TDSTG).

Cross-cutting Review of Science and Research

On 25 June 2001, the Chief Secretary to the Treasury, Andrew Smith, announced seven initial cross-cutting reviews to contribute to the Spending Review 2002. The Science and Research cross-cutting review included a review of funding of the UK science base, and the effectiveness

of departments' own science and research programmes to ensure that they deliver maximum long term benefits to the economy and quality of life. The terms of reference included:

- to assess the **scientific and technological capabilities of government departments** with significant research needs; to review current and planned levels of activity; and compare both capabilities and activity levels with likely scenarios over the next decade, and to identify priorities; and

- to identify proposals for improving the **effectiveness and value for money** of civil research commissioned by departments, to **maximise the impact of available resources**; and to increase the **contribution made to the Government's broad goals** for the economy and quality of life, including mechanisms for knowledge and technology transfer.

Lord Sainsbury (Minister for Science) was the ministerial lead for the Review and was supported by a team of officials from HM Treasury, the Office of Science and Technology and the Department for Education and Skills. The Review reported to ministers in March 2002 and was used, with the Roberts Review, as key input to the 2002 Spending review and to the Government's science strategy *Investing in Innovation: A strategy for science, engineering and technology*, published July 2002.

One of the review's conclusions was that:

> *High quality outputs require adequate inputs in terms of money invested in research. There has been a general decline in spend on civil research and development by government departments through the 1980s and 1990s. This trend has now been reversed. The decision in SR 2000 that the research spend of the main civil departments should at least be maintained in real terms has made a significant contribution. This improvement needs to be sustained.*

The review also recommended that all departments have Chief Scientific Officers:

> *Every department which conducts or commissions an appreciable amount of research, or uses science should have a Chief Scientific Adviser, accountable to the Secretary of State and Ministers for science procurement and advice within the department. Departments which rely heavily on scientific and technological input across the range of their activities need a more or less full time Adviser, with a place on the department board.*

From a stakeholder relations standpoint, what is more important than the specific recommendations of the cross-cutting review, is the fact that the review was undertaken in the first place. Reviews such as these, conducted under the auspices of a central agency (HM Treasury) provide an excellent forum for high-level discussion of the (S&T) capacity needs of government.

6.4.3 The Royal Society

The Royal Society plays an important role in ensuring that the public and government appreciate its significance. Providing independent advice on scientific issues, some of which are highly controversial, has been a cornerstone of the Society's activities for many years. The Society deals with both policy for science and the scientific aspects of public policy, nationally and internationally. The purpose of its work is to inform policy-making. The outputs of its work may include briefings for Officers, Council and colleagues, major policy studies, research projects, submissions to various Parliamentary and Government inquiries, public statements, meetings and private discussions with key individuals.

The Royal Society Science Briefs aim to provide core information on contemporary scientific issues to promote open and informed debate on such topics as: GM Animals, Foot and Mouth, Who owns your DNA?, Genetic Testing, Stem Cells and Cloning, and Who Controls Scientific Research?

The Royal Society's MP-Scientist Pairing Scheme was successfully launched in 2001. The MP-Scientist Pairing Scheme aims to:

- Help scientists recognise the potential methods and structures through which they can feed their scientific knowledge to parliamentarians. This should enable MPs to put forward an informed view when discussing key science policy issues.

- Help practising research scientists understand the pressures under which MPs operate - time allocation, constituents' interests, demands of the political system and the parliamentary timetable.

- Give MPs the opportunity to forge direct links, for immediate and future use, with a network of practising research scientists; and,

- Give MPs the opportunity to familiarise themselves with the mindset of scientists and the science community and vice versa.

The scheme aims to build bridges between some of the best research workers in the country and members of the UK parliament. In the first year, 6 MPs and 6 research scientists were paired together and spent time in the laboratory and in the constituency. In November 2001, the scientists spent one week in Westminster shadowing their MP, attending various seminars and gaining first hand experience of how science policy is formed. In 2002, the second year of the scheme, 14 pairs of MPs and scientists from Northern Ireland, Wales and England took part.

The Royal Society's Science in Society programme includes a series of nationwide Speaking Out meetings. These meetings enable a wide variety of people with a diverse range of opinions to discuss science in society issues with practising scientists, local policy makers, members of the media, health care professionals and other stakeholder groups. The project guarantees that all voices are heard in an open exchange of views and aims to influence policy at local and national level.

6.4.3 Royal Society of Chemistry Parliamentary Link Scheme

The RSC runs an innovative and pioneering scheme - the Parliamentary Link Scheme - which provides for the many MPs from all three major parties who currently participate. The Link Scheme provides a means of mutual contact between the RSC Link and the MP, and a mechanism to offer briefing and material to the MP which may be of assistance.

An MP joining the system is "linked" with a member of the RSC who lives in that MP's constituency and to whom the MP can turn to for advice and/or scientific assistance on chemical science, or on any matter concerning the RSC. The MP is also provided with background briefing material by the RSC directly on subjects concerning chemical science whenever they arise (whether in legislation, Parliamentary Questions, general or adjournment debates etc) in the course of the weekly cycle of parliamentary business.

The Link MPs receive occasional invitations to events organised by the RSC: most important is the annual Parliamentary Links Day. This is held at the House of Commons and takes the form of a morning session featuring short presentations by specially invited speakers followed by a luncheon which provides an opportunity for Link MPs and RSC Links to meet informally.

RSC also runs an annual Parliamentary Links Day that involves presentations and speeches by members and parliamentarians. Through its parliamentary activities, the RSC takes an active interest to fulfil its Royal Charter commitment "to serve the public interest". In the past, the RSC has:

- submitted written evidence to the House of Commons Select Committee on Education and presented oral testimony before the Committee on initiatives taken by the RSC to promote the best quality science education at both primary and secondary level;
- provided briefings for MPs on a wide variety of issues debated in Parliament. A full list of the RSC's briefings in Parliament;
- provided background briefing for MPs on all sides of the House on Oral Parliamentary Questions (tabled independently by MPs) on chemistry-related subjects;
- provided a detailed brief for MPs debating the allocation of public expenditure to the Research Councils when the Commons debated the Science Budget;

- tabled Early Day Motions on issues ranging from Parliamentary Links Day to the Nobel Prize for Chemistry.

Finally, The RSC provides direct assistance to MPs (including all Link MPs) whenever the occasion arises. This can include:

- background briefs for Ministerial Statements of general debates in the Commons on scientific issues;
- briefings for use in the Committee or report stages of legislation;
- personal assistance for Parliamentary Questions and Adjournment debates; and
- for constituency purposes.

6.4.4 Commons Select Committee on Science and Technology

The Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Office of Science and Technology and its associated public bodies. It is one of the departmental select committees, the powers of which are set out in the House of Commons Standing Orders, principally in SO 152. The Committee consists of 11 Members of Parliament, one of whom is elected as Chairman. The party balance reflects that in the House of Commons. (At present, the Committee has 7 Labour Members, 3 Conservatives and 1 Liberal Democrat). The Committee is supported by a small secretariat, headed by the Clerk of the Committee, and by specialist advisers.

The Committee has existed, in its current form, since 1992. There was a Select Committee on Science and Technology between 1966 and 1979, established "to consider science and technology and report thereon" (this was abolished when the departmental select committee structure was established).

The Committee decides its own programme. It decides on topics for inquiry; invites written evidence, holds informal visits, briefing meetings and public evidence sessions; and then publishes a report with its findings and recommendations. The Government responds to its report, normally within two months. If appropriate, there may then be a debate in the House of Commons.

As well as these public inquiries, the Committee undertakes on-going scrutiny of the administration and expenditure of the Office of Science and Technology and the Research Councils.

6.4.5 Lords Select Committee on Science and Technology

The Science and Technology Committee was established in 1979 and is one of the main investigative committees in the House of Lords. It fulfils one of the major roles of the House as a forum of independent expertise and draws on the wide experience of the members of the House. Within the Committee's broad remit "to consider science and technology", it examines matters with which Parliament ought to be concerned. It works principally through Inquiries undertaken by two Sub-Committees, constituted afresh for each Inquiry.

Each Inquiry leads to a Report, published together with the evidence on which it is based, setting out the Committee's findings and making recommendations to the Government and others. The Committee's broad remit permits it to investigate activities across the whole range of government such as:

- Public policy areas which are, or ought to be, informed by scientific research: e.g. health effects of air travel, complementary and alternative medicine, legal status of cannabis.
- Technological challenges and opportunities - existing and future - which government faces or ought to face: e.g. resistance to antibiotics, management of nuclear waste, human genetic databases, innovations in microprocessing, and the implications of digital imaging for the law of evidence.
- Public policy towards science itself, e.g. as it affects Research Councils, schools and universities, public sector research establishments and industrial research and development.

The Committee seeks to balance life sciences and physical sciences across its programme; it does not often undertake inquiries based purely on social science or economics.

The Committee has around 15 members, re-appointed by the House for each Session of Parliament. Members are nominated by their political parties and by the "cross-benchers" (independents). The number of seats for each group is negotiated; the cross-benchers have always been well represented. The Committee has always included distinguished scientists, including, from time to time, Nobel Prize winners, Fellows of the Royal Society and the Royal Academy of Engineering, and members with medical backgrounds, as well as lawyers, economists, politicians and members with other expertise and interests.

The Chairman of the Committee is appointed by the House. The Committee has power to add to its own membership. This has been used sparingly, for instance when a distinguished scientist has joined the House and there is no immediate vacancy.

Each major report is drawn up by a sub-committee. Members are drawn from the Committee, with additional members chosen for specific inquiries because of their relevant expertise.

Sub-committees are chaired for the duration of the inquiry by the most appropriate Committee member. Sub-committees usually meet weekly when the House is sitting.

Like other parliamentary committees investigating policy issues, they employ external Specialist Advisers, taken written and oral evidence, and visit relevant places and organisations. Inquiries can last as long as a year. A report, based on the evidence received, is then published by the Committee and later debated in the House of Lords.

The Committee produces three or four major reports in a normal Session. The Committee sometimes undertakes shorter inquiries, often following up previous work. Continuity in the Committee's membership helps ensure that issues and recommendations are followed up in this way. Unlike MPs, Lords do not lose their seats at general elections and, although a "rotation rule" ensures that membership is regularly refreshed, there is a strong element of continuity.

Sometimes, the Committee takes evidence from Ministers on topical issues outside the framework of long inquiries. For example, on 23 November 2001, the Committee took evidence from the Minister for the Environment to discuss issues arising from the Government's consultations inspired by the Committee's 1998 Report on Management of Nuclear Waste

Committee recommendations are largely directed at Government, though they may also have implications for industry, the professions and others. The Committee influences Government, and others, in several ways:

- The mere existence of a Committee inquiry stimulates debate in the community concerned, and sometimes in the media.
- During the preparation of oral and written evidence the Government is forced to examine and defend its policy and sometimes reformulate it;
- The Government is required to respond in writing to all the Committee's reports within 6 months.
- When the report is debated in the House further ministerial comment is made and the opposition parties must also declare their positions on the issue.
- Sometimes bills are amended on the basis of Committee recommendations.

Although the Government did not accept the main recommendations of the Committee's report on Cannabis, The Scientific and Medical Evidence, that cannabis should be legalised for medical use, the report raised the profile of a difficult issue and gave encouragement to research, which is now well under way.

6.4.5 Parliamentary Office of Science and Technology (POST)

POST is an office of the two Houses of Parliament (Commons and Lords), charged with providing balanced and objective analysis of science and technology based issues of relevance to Parliament. Its definition of science and technology is very broad, so POST carries out studies in areas such as defence, transport, environment and health as well as science policy.

POST is headed by a director responsible to a parliamentary board which sets broad policy and priorities for the office, and ensures an effective and practical working relationship between Members of both Houses, Select Committees, the libraries and the Office. The board is appointed by official parliamentary procedures. The board comprises parliamentarians from both Houses and from all parties, aided by distinguished scientists and engineers representing a wide range of interests and disciplines. The board, in conjunction with the director, decides on each issue on which POST will report. POST is thus directed by parliamentarians for parliamentarians.

The inspiration for POST came from within Parliament itself, as it became increasingly clear how far scientific and technological issues underlay much of its business. A number of Members felt a corresponding need for an organisation which would provide impartial information and analysis of these issues. Parliaments in the USA, Denmark, France, Germany, the Netherlands, and also the European Union had already established such offices.

To this end, in 1986 the all-party group, the Parliamentary and Scientific Committee decided to set up the Parliamentary Science and Technology Information Foundation (PSTIF) as a charitable foundation. After an appeal in 1987, sufficient funds were raised from charitable trusts, learned societies, private enterprises and numerous individual parliamentarians, to create the Parliamentary Office of Science and Technology.

After three years' demonstration of a range of services to parliamentarians and Select Committees, the case for Parliamentary funding of POST was reviewed in detail by the House of Commons Information Committee during 1991/2. It recommended that Parliament should directly support the work of POST. POST thus became an integral office of Parliament on 1 April 1993. In October 1995, the Information Committee recommended funding for POST until at least 2001, and in July 2000 they recommended that POST be established permanently, with Parliamentary funding. This was debated on 21st November 2000. Richard Allan MP, Chairman of the Information Committee, requested the House to accept the recommendations made by the Committee in its review of POST. Dr Ian Gibson, current Chairman, and Dr Michael Clark, former Chairman, spoke from the government and opposition benches in support of the motion. After several other Members had commented on the activities of POST, Dominic Grieve MP, the support of the official opposition, leaving Paddy Tipping MP to conclude similarly for the government. The motion was approved without a division. From April 2001, POST may become the first new permanent institution of Parliament for some forty years.

POST aims to provide parliamentarians from both Houses with information which will enlarge their understanding of the scientific and technological implications of issues which involve them as legislators. POST responds to Parliament's needs for specific information and analysis, whether they arise from the needs of individual Members or Select Committees. POST may also anticipate and assess the needs of Parliament on issues where policy cannot be satisfactorily formulated without a fuller understanding of the scientific and technological implications.

Drawing on the talents, knowledge and expertise of the science and engineering community, POST acts as an independent and unbiased source of information. It is politically neutral, serves Parliament as a whole and presents analyses and policy options tailored to the parliamentary process. POST regularly produces a series of **Parliamentary Briefing Notes** on such subjects as diverse as:

> Childhood obesity. Four page POSTnote, summer 2003
>
> National surveys show that the prevalence of obesity among schoolchildren has doubled since the mid 1980s. This is of particular concern since obesity is a risk factor that has been implicated in a number of serious conditions including cardiovascular heart disease, type 2 diabetes, certain cancers and osteoarthritis. This briefing examines possible factors behind the observed rise in childhood obesity, evaluates the likely consequences and examines policy options for reversing current trends.
>
> Infectious diseases in developing countries Four page POSTnote, autumn 2003
>
> This POSTnote describes the situation in developing countries as far as the 3 main 'killer diseases' are concerned: TB, HIV/AIDS and malaria. While the developed world already has an array of technology to help combat these diseases, there are significant economic and political obstacles to the implementation of effective programmes in developing countries. Among the issues examined are whether there is a need for a new global development agency to implement programmes, and policy options for funding/encouraging research into the new vaccines, pesticides and anti-microbials that are needed to fight these growing epidemics.

Transparency in animal research. Four page POSTnote, autumn 2003

In 2002, a House of Lords Select Committee recommended the repeal of the so-called 'confidentiality clause' in the Animals (Scientific Procedures) Act 1986, which prohibits the unauthorised release of confidential information about the use of animals in experiments. The Government, through the Home Office, is consulting with the scientific community before reaching a decision on this recommendation. At the same time, anti-vivisection groups are using the Freedom of Information Act 2000 to request information that is currently protected under the confidentiality clause. This briefing outlines the current legislation, summarises what information on animal experiments is currently published and examines the main issues arising from the consultation. In particular, it examines whether some 'middle ground' exists, that allows summaries of research to be published without jeopardising the well being of researchers.

Changing the Mental Health Act, Four page POSTnote, autumn 2003

The Government is consulting on proposed changes to the Mental Health Act throughout summer 2003; previous proposals to amend this legislation have proved controversial. This briefing examines the proposed changes and analyses the issues that arise.

7.0 STAKEHOLDER RELATIONS FOR SBDAS

In previous sections we indicated some of the communication challenges facing SBDAs (Chapter 3). We discussed how the stakeholder relations approach would work at the level of an individual SBDA (Chapters 4, 5). We also noted some of the relations between science and government in the US and UK (Chapter 6). In this section we talk about how the stakeholder relations approach would work at a "horizontal" or corporate level - that is, representing all SBDAs.

7.1 Goals and Objectives

The purpose of a joint (or "horizontal") stakeholder relations (communications) strategy for SBDAs is to provide a plan and mechanism(s) that will help the federal S&T community as a whole to increase its stakeholders' confidence in their activities, by launching a joint communication plan that will address common communication challenges (see Chapter 3 for a discussion of the challenges). The purpose of the strategy is to ultimately enlarge the federal S&T "pie", so that each member's "slice" can expand accordingly. Such a strategy would have several high-level goals and operational objectives:

Goals

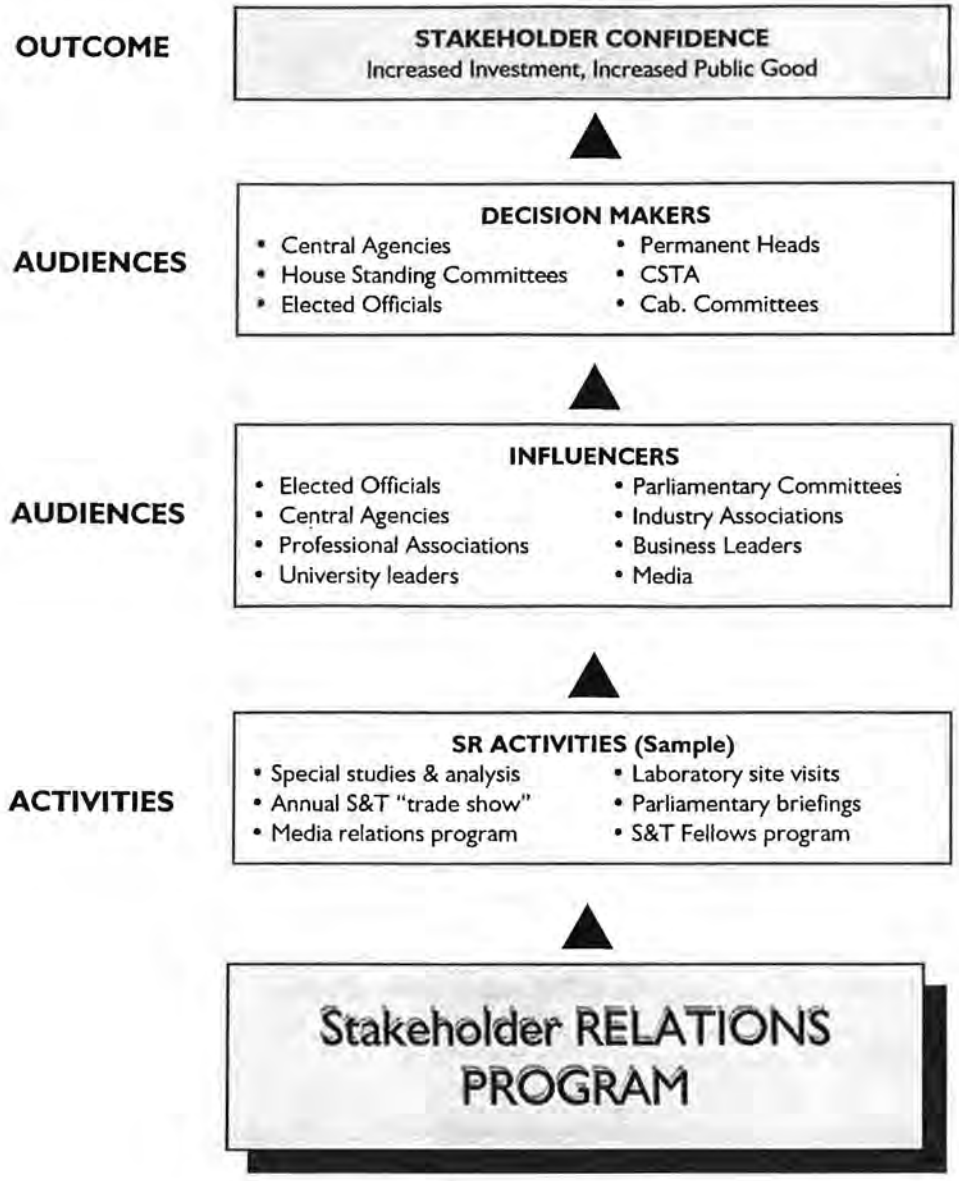
- Communicate information about the unique role, activities, value and impact of federal S&T;
- Develop and communicate common messages to their "stakeholders"; and,
- Establish a process of 2-way communications with stakeholders.

Objectives

- Raise basic awareness of the nature and benefits of federal science and technology activities;
- Promote an ongoing interest in the work of SBDAs;
- Cultivate an active desire to maintain and enhance the government's S&T investment in the departments; and,
- Encourage action to support specific investment opportunities.

Figure 5

Stakeholder Relations Model For Federal S&T



7.2 Audiences

The primary audiences for an SBDA stakeholder relations program are the "decision makers" and "influencers" whose attitudes, opinions, beliefs and actions shape the future of science in government.

Decision makers are a small core of individuals and organizations within government who ultimately decide on policies and resources. They include:

- Permanent Heads
- Central Agencies (Prime Minister's Office, Privy Council Office, Finance, Treasury Board)
- Cabinet Committees
- Clerk of the Privy Council

Influencers comprise a much larger group that wields no direct authority over the decisions that affect SBDAs, but whose ideas and activities nevertheless shape the climate for decision making for federal S&T. Key groups of influencers include:

- Elected Officials (Parliamentarians)
- Parliamentary Committees
- Council of Science and Technology Advisors (CSTA)
- Advisory Council on Science and Technology (ACST)
- Industry associations
- Professional associations
- Business leaders
- University leaders
- Media

The challenge of a joint stakeholder relations strategy is to increase stakeholders' and influencers' confidence in and support for the federal S&T enterprise.

7.3 Principles of Stakeholder Relations

Following is a set of principles that should guide SBDA stakeholder relations.

1. **Communication is a 2-way street**

   Effective communication rests on establishing an effective 2-way dialogue with decision makers and influencers. It is important to understand and listen to the opinions, attitudes and beliefs of different audiences, and to meet their needs for information and advice.

2. **Personal communications are most effective**

   The most effective form of communications is personal communications. An effective stakeholder relations strategy should emphasize face-to-face communication and first-hand experiences. The ideas is to provide opportunities for key audiences to develop a first-hand experience of federal science and technology; for example site visits to mines, fish farms, labs, field test sites, and so forth.

3. **Demonstrate impact on Canadians**

   Governments support in-house S&T activities, not for their own sake, but to meet the needs of Canada and Canadians. The federal government has many stakeholders, representing a wide variety of constituencies: farmers, fishers, SMEs, civil society, health care workers, patients, etc., etc., etc. SBDA stakeholder relations needs to demonstrate its impact on and benefit for the government's stakeholders.

4. **3rd parties support is powerful**

   It is often the case that 3rd parties - for example a department's partners, clients and other stakeholders - can argue more persuasively for a cause (i.e. federal S&T) than SBDAs can themselves. Testimonials from people and organizations who SBDAs work with can be more effective than an organization's own efforts to promote its cause. The doubling of the NIH's budget within five years is a direct result of the efforts of its many stakeholders arguing for the benefits of medical research, and the importance of NIH's role.

5. **Capture the attention of advisors**

   Decision makers (e.g. cabinet ministers) are surrounded by people whom they rely on for advice. It is equally important to work with advisors to make one's case, as it is to directly influence decision makers.

6. **Back arguments with research: facts, figures and original research**

   SBDAs need to make their case with facts, figures and original research, and not just with polemical arguments. Has federal S&T suffered from a decade of budget cuts? Put together the relevant facts as the basis for making the argument.

7. **Emphasize the need for balance in the national system of innovation**

   A balanced national system of innovation requires that each leg of the S&T "stool" is balanced: the country needs strong university S&T, industrial S&T and government S&T. Federal S&T should not put itself in opposition to university and industrial science, but

should promote itself as an important partner with those sectors.

8. **Take a long term perspective**

   Stakeholder relations needs to focus on the long term. Its objective is to prepare the ground and sow the seeds for the long term future of science in government.

7.4 Messages

The core stakeholder relations message is that it makes good sense for the federal government to invest in a strong in-house science and technology capability. Why?

To protect and expand our current economic base. Government's main priority is to protect the viability of our existing economic base, so the base does not erode prematurely, before new industries and new companies arise. The Canadian economy is multi-faceted, and ensuring the viability of all sectors of the economy is a principal role of government. Federal labs underpin the viability of these sectors.

As a driving force for innovation. Government's second main economic priority is to foster a more innovative economy, meaning that existing industries become more competitive and that new industries and new companies arise to expand the base. Innovation will produce the industries and jobs of the future. Federal labs promote innovation in the economy and society.

To protect the health and well-being of Canadians. Federal S&T acts as the guardian of Canadians' health and safety: it protects us from such dangers as infectious diseases, security of the food supply, terrorism, severe weather, natural disasters, etc. That job requires a "standing army" in the form of the federal S&T community, able to respond quickly to sudden problems.

To provide a stable infrastructure capable of meeting national needs in times of crisis. The country's response to new issues (e.g. SARS, BSE, West Nile Virus, anti-terrorism, climate change) depends on having a core infrastructure of facilities, knowledge and expertise ready to act in times of need. Nations cannot build a national science infrastructure from start to meet every new crisis.

For sustainable development and to meet international obligations. Increasingly, Canada is a signatory to international agreements (e.g. global warming) that commit us to measures that can only be achieved by the application of leading-edge S&T. Federal labs are in the forefront in developing, testing and certifying these solutions.

As an independent and speedy source of research, assessment and policy advice. Government needs an independent source of S&T advice that can produce fast advice in times of urgent need - for instance for civil emergencies - to help negotiate international treaties, or set regulatory standards.

To guard against crown liability. Recent events (e.g. Hepatitis C, collapse of the cod fishery) have made clear the Crown's exposure to financial risk as a result of decisions taken or not taken. A strong S&T establishment can help avoid these problems.

To manage science and technology for national policy interests. Unlike university and industrial science, government science is directly oriented towards addressing

As a tool for diplomacy and international relations. Science and technology are inherently international in their perspective and their operations. Federal S&T supports Canada's diplomatic objectives and enhances our place in the world.

As a training ground for youth. Federal labs have historically acted as an important training ground for the next generation of scientists, technologists, and business leaders. The government is emphasizing youth employment, and federal labs can make a similar contribution today.

These are some of the more important messages that the SBDA community will want to convey to its community of stakeholders.

7.5 SR Activities

The range of possible stakeholder relations activities is potentially very large. Appendix I contains a list of potential SR activities that SBDAs could undertake. Some of these would require money to be spent, while others would only require in-kind support (staff time).

7.6 Organizational Options

This section of our report talks about what it would take to implement a stakeholder relations program for the federal S&T community. The objective is not to replicate the various communication activities of partner SBDAs, which largely focus on the activities and achievements of individual departments. Instead, the stakeholder relations program is intended to promote the entire community. In some instances (see Appendix I) it will be possible to build on existing departmental and inter-departmental communications, whereas in others it will be necessary to launch new initiatives. Following is a set of options for rolling out a stakeholder relations program, along with a rough estimate of costs. None of the options envisages a large

commitment of full-time PYs.

7.6.1 Model 1 - Full-Time Secretariat

In this model, SBDAs would jointly support one full-time PY, at a senior level (DG or ADM), to fill the role of "Stakeholder Relations Coordinator". The coordinator position could be stand-alone, possibly housed in one host department, or alternately, part of any new interdepartmental S&T coordination office that might result for the current discussion among ADMs on horizontal linkages. This individual would plan, coordinate and in many instances deliver the stakeholder relations program. As required, the coordinator would call on participating SBDAs to contribute staff time, for periods of up to 12 months, in order to implement different SR programs or projects.

The coordinator would develop an annual SR plan and propose a budget to ADMs. Depending on available resources, ADMs would decide which elements of the plan they wanted to finance.

Resources: 1 PY + approved activities

7.6.2 Model 2 - Part-Time Secretariat

In this model, one individual would be assigned the role of SR coordinator on a part-time basis (nominally half-time). He or she would set aside a fixed percentage of their time to fulfil the SBDA SR function. As in the full-time model, the coordinator would develop an annual SR plan and budget, and ADMs would approve and fund each year's activities. The part-time coordinator would call on partner SBDAs to donate staff time, as required, to implement various projects.

Resources: 1/2 PY + approved activities

7.6.3 Model 3 - Rotating Secretariat

The rotating secretariat model would not have a dedicated SR staffer (as proposed in Models 1 and 2). Instead, one individual from each participating department would be assigned to fulfil the SR coordinator function on a rotating 3 or 6 month schedule. The individual would be able to call on other SBDAs to help staff different projects.

Resources: Part-time staffer + approved activities

7.6.4 Model 4 - "Friends of Federal S&T"

A fourth model envisages the formation of an arms-length, private, non-profit organization, nominally titled "Friends of Federal S&T". Composed of former public servants, but financed in large part by SBDAs, this group would make the case for federal S&T on behalf of the community.

Resources: Financial support to an outside organization

8.0 CONCLUSION

The federal science community faces challenges in promoting its activities and impact to a broad community of stakeholders. It also has tremendous opportunities to do so. There are communications challenges with respect to:

- Awareness and perception of federal S&T
- Unique role of federal S&T
- Federal S&T resource allocations mechanisms
- Achievements of federal S&T
- Human resources and recruitment

This report also discusses the opportunities. It presents some models for joint stakeholder relations. It also summarizes the stakeholder relations experience of science organizations in the US, UK and Canada. It lays out many specific ideas or projects that could be undertaken, many at little or no direct cost.

SBDAs are already linking their S&T human resource activities. Discussions currently underway among ADMs could well lead to a more extensive collaborative approach to managing S&T across departments and agencies. There is no reason why stakeholder communications could not also be managed jointly, given a will and a mechanism to do so.

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Appendix I
Potential Stakeholder Relation Activities

The following list of potential SR activities is adapted from the June 1998 study prepared for the 5NR ADMs[17]. At that time, discussions with departmental representatives yielded over 20 worthwhile activities that could be implemented in the short or medium term. Many of these were intended to build on existing initiatives, and so did not need to be developed from scratch. A number of the possible activities require no little or no money, though they may demand staff time.

A. DECISION-MAKER AUDIENCE

The action plan has identified a series of projects aimed a decision-maker audience. Following is a brief description of those projects.

Presentations to Parliamentary Committees

There are 11 standing committees of the House of Commons[18] and 8 standing committees of the Senate[19] to which federal S&T activities are directly relevant. A proactive communications effort in which the federal S&T community takes the initiative in offering to provide information and analysis to the various committees could go a great way toward building awareness and interest in the role and impact of federal S&T.

Cost: n.a.
Revenue potential: n.a.

Active Participation in PAGES Program

The Parliamentary Group for Engineering and Science (PAGES) is an independent organization formed by a number of the leading science and engineering professional organizations and

[17]"Your Resource for the Future". 4NR+H COMMUNICATION ACTION PLAN.

[18]Commons Committees: Aboriginal Affairs, Northern Development and Natural Resources, Agriculture and Agri-Food, Environment and Sustainable Development, Fisheries and Oceans, Foreign Affairs and International Trade, Government Operations and Estimates, Health, Human Resources Development, Industry, Science and Technology, National Defence and Veterans Affairs, Transport.

[19]Senate Committees: Agriculture and Forestry, Energy, the Environment and Natural Resources, Fisheries and Oceans, Foreign Affairs, National Finance, National Security and Defence, Social Affairs, Science and Technology, Transport and Communications.

societies. PAGES organizes breakfast meetings in the House of Commons cafeteria, where scientists and engineers address a wide range of topics of interest to parliamentarians. These is an opportunity for SBDAs to become actively involved with this group as organizers, speakers and commentators. PAGES is an excellent forum for increasing awareness of the federal S&T portfolio.

Cost: $500
Revenue potential: n.a.

Treasury Board/Finance Analyst Field Trips

Each of the participating departments should have an active plan to provide their Treasury Board and Finance analysts with first-hand experience of their people, activities and impact. Departments should be organizing a regular schedule of field trips where analysts can visit regional and headquarters laboratories and field work sites, and also meet with industry partners and stakeholders with whom the departments are working.

Cost: $0-50,000[20]
Revenue potential: nil

Regional "Account Manager" Program

This project is designed to be built around regional laboratories. These groups tend to be important institutions in their communities. Regional laboratory directors should developing relations with area MPs, to let them know about the work that the labs are undertaking, and its importance for wealth creation, quality of life, and sustainable development. MPs should be invited to participate in open houses and other important events throughout the year.

Cost: n.c.
Revenue potential: n.a.

[20]The cost will depend on whether analysts have their own travel budgets.

Policy Studies

SBDAs can take a leadership role in commissioning studies of important government-wide S&T policy issues, and promoting the findings of these studies with decision makers. Policy studies could focus on such issues as: Impact of Federal S&T, National System of Innovation, or National S&T Human Resources. Such policy studies would be co-funded by all SBDAs.

Cost: $75,000 shared among departments
Revenue potential: n.a.

CCMD Brown Bag Luncheon Presentations

The Canadian Centre for Management Development organizes regular brown bag luncheon presentations on themes of interest to federal government managers. SBDAs should regularly offer to make presentations on important federal and national S&T issues, as a way of increasing awareness and interest in federal S&T among senior officials from other departments.

Cost: n.c.
Revenue potential: n.a.

***Scientist/Engineer-in-Residence* Fellows Program**

Modeled on similar initiatives in the U.S. (NAS, AAAS), this project would match scientists and engineers with House of Commons committees and administrative groups (e.g. Research Branch). Employees would be offered the opportunity to spend a year working with parliamentarians. The idea is to provide hands-on help to parliamentarians, and at the same time introduce them to scientists and engineers who have real-world experience to offer.

Cost: In-kind
Revenue potential: n.a.

EX Training - S&T Course Module

Familiarizing the next generation of federal government mangers with the government's S&T activities, resources and challenges would be a worthwhile activity. SBDAs could offer to work with CCMD to develop such a module to be offered to all EX trainees.

Cost: $30,000 shared among SBDAs
Revenue potential: n.a.

B. INTERNAL AUDIENCES

Following are four initiatives that would address the communication needs of internal and external audiences.

Federal S&T Awards Program

This is envisaged as an annual, black-tie event, and would be held at a venue such as the Museum of Civilization. Awards categories would be established by a program committee (e.g. Best basic research discovery, Best technology transfer, Best industry/government collaboration, Scientist of the Year, etc.). Organizers would invite a person of the stature of the Governor General to be the patron of the event.

Cost: $75,000
Revenue potential: $50,000 from partners and stakeholders

Orientation program for new hires (with CCMD)

This program - possibly 3 day in length - would be offered to new science and engineering hires in SBDAs. The program would deal with such matters as: Role of the federal scientist and engineer, Ethics, Communications, Machinery of government, etc. CCMD might be asked to help organize the deliver the program.

Cost: $50,000
Revenue potential: $25,000

Media training workshop for scientists

Though a number of SBDAs periodically offer their staff media training workshops, the idea is to pool the requirement across departments and offer a regular schedule of workshops for scientists and engineers.

Cost: $25,000 shared among departments
Revenue potential: n.a.

Photo library

Modeled on an Agriculture Canada product, this would be a CD ROM-based library of copyright-cleared images representing the activities of the SBDAs. The images could be used for a wide range of products, from overhead presentations to publications.

Cost: $20,000
Revenue potential: n.a.

C. MEDIA

Media Tip Sheets

A number of departments are currently experiencing good take-up of stories highlighted in media tip sheets. This activity is not proposed as a joint project; rather, each department should consider whether it would benefit from this communication vehicle and develop its own.

Cost: n.c.
Revenue potential: n.a.

PMTs for Regional/Weekly Media

Several departments have had good take-up of PMTs by regional and weekly media. PCO communications has recently promoted this communication vehicle. A weekly *Resources for the Future* series could be developed, focusing in turn on a different departments' work each week.

Cost: $30,000
Revenue potential: n.a.

Summer Journalism Student Internships

Educating the media about federal S&T is a long-term challenge. Many departments have summer student internship programs for scientists and engineers. The idea here is to extend these internships and offer a small number of journalism students the opportunity to work in federal labs. We envisage a 2-way benefit: students learning about science and engineering, and scientists and engineers learning about the media.

Cost: $45,000
Revenue potential: n.a.

Directory of Federal S&T Expertise

This is envisaged as both a print and a Web-based product. The print version would be mailed to newsrooms, while the Web directory would be accessible to accredited reporters, by password. The directory might also contain a list of authorities and spokespersons on different topics.

Cost: $25,000
Revenue potential: n.a.

Risk Communication Spokesperson

Departments should consider being pro-active in their (crisis) communication. Each department should identify one or more individuals who can act as spokespersons on science or technology issues that arise. These individuals should receive media relations training.

Cost: n.c.
Revenue potential: n.a.

Sponsored Workshop with Science Writers' Associations

SBDAs might like to consider sponsoring a workshop along the lines of *Reporting Federal Government Science and Technology*, in association with CSWA and/or ACSQ. This would be a good opportunity to develop a working relationship with individual science reports and their professional associations.

Cost: $15,000
Revenue potential: n.a.

D. EXTERNAL AUDIENCES

Although communication with external audiences (public-at-large) is not a cornerstone of this action plan, a number of useful ideas were proposed. Some of these are currently being implemented, or have been undertaken in past.

Discovery Channel Spots (*Earthtones*)

These would be an expanded series of (5NR) vignettes that focus on different aspects of federal S&T, in association with Discovery Canada.

Cost: $150,000
Revenue potential: n.a.

Consultation with Universities

A number of departments have indicated the need for the federal science establishment to foster improved relations with the university community. Proposed here is a meeting between a representative of the SBDA community and the committee of Vice Presidents Research of the "G10" universities (Canada's 10 largest research universities). The purpose of the dialogue is to describe the scope of current federal/university interaction (see *Research Opportunities* brochure below), discuss barriers to increased cooperation, and develop new collaborative arrangements.

Cost: n.c.
Revenue potential: n.a.

Federal S&T Career TV/Radio Spots

The age bulge in the federal public service will require the hiring of a large number of public servants - including scientists and engineers in the coming years. In order promote these career opportunities, the Public Service Commission may want to utilize radio or television ads. The idea here is for SBDAs to discuss future plans with PSC, and if circumstances are right, to offer to work with PSC to include science and engineering careers in a pilot project.

Cost: n.c.
Revenue potential: n.a.

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Science Policy Branch - Environment Canada
Working Paper Series

1 *Environment Canada's Scientific Research Publications in 1995*

2 *Science for Sustainable Development*

3 *Communicating Science at Environment Canada: A Brief Review of Lessons Learned from Communications on Acid Rain and the Depletion of the Stratospheric Ozone Layer*

4 *The Precautionary Principle, Risk-Related Decision Making, and Science Capacity in Federal Science-Based Regulatory Departments: A Discussion Document*

5 *Strengthening Environmental Research in Canada: A Discussion Paper*

6 *Environment Canada's Scientific Research Publications 1980-1997*

7 *Research & Development and Related Science Activities at Environment Canada*

8 *Measuring The Impacts Of Environment Canada's R&D: A Case Study of Pulp & Paper Effluent Research*

9 *Measuring The Impacts Of Environment Canada's R&D: A Case Study of Stratospheric Ozone Depletion Research*

10 *Measuring The Impacts Of Environment Canada's R&D: Notes On Methodology*

11 *Science Advice in Environment Canada*

12 *Environment Canada University Research Partnership Expansion Strategy: A Discussion Paper*

13 *Environment Canada's S&T: Expenditures & Human Resources, 1990-1999*

14 *National Environmental R&D Agenda-Setting: A Commentary on Issues, Options, and Constraints*

15 *Science in the Public Interest: Values and Ethics in the Management, Use and Conduct of Science at Environment Canada*

16 *Bibliometric Profile of Environmental Science in Canada: 1980-1998*

17 *Implementing the Principles and Guidelines of the Framework for Science and Technology Advice: A Guide for Science and Policy Managers*

18 *Role of a Renewed 5NR MOU in the Evolving Spectrum of Horizontal Federal S&T Management*

19 *Toward a Canadian Stewardship Framework for GMOs - A Discussion Paper*

20 *S&T Excellence in Environment Canada: A Self-Assessment Tool based on the CSTA STEPS report*

21 *Environment Canada's Research Laboratories: Institutional Change and Emerging Challenges - Three Case Studies*

22 *Canadian Environmental Sciences Network (CESN) Discussion Paper*

23 *International Comparative Study of Approaches Used to Address Issues that Cut Across Science-Based Departments*

24 *Framework to Assess Environmental Science and Technology Research Capacities in Canada*

25 *The Atlantic Environmental Sciences Network: Lessons Learned in the Formation of an Environmental Development Network*

26 *A Stakeholder Relations Strategy for Federal S&T*

27 *The Changing Federal S&T Innovation Institutional System: An Exploratory Look*

28 *The Governance of Horizontal S&T: Issues and Options*

29 *Ecosystem Effects of Novel Living Organisms (EENLO) – Governance Model*

30 *Approaches to Developing National Environmental Research Agendas in Six Jurisdictions*